



SCIENTIFIC  
AMERICAN

# Cumulative Index

1948-1978





**SCIENTIFIC  
AMERICAN**

# Cumulative Index 1948-1978

*Index to the 362 issues from  
May, 1948, through June, 1978*

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# Preface

**T**his *Cumulative Index* embraces, inclusively, all issues of SCIENTIFIC AMERICAN from May, 1948, (the first under the magazine's present editorial direction) through June, 1978.

References are by year, month and page of issue, in that order; thus, the entry "1954 Aug. p. 77" refers to page 77 of the August, 1954, issue. The Index consists of eight independent parts, each alphabetically arranged, as follows:

*Index to Topics* offers access to the subject matter covered in 2,964 articles and some 3,500 "Science and the Citizen" items published in 362 issues indexed. This is a rotated key-word index. That is, the topics covered in a given article or item are cited by "key words" (average of seven per article and two per item). The key words are entered together in a cluster, and each key word takes its turn as the first term in the cluster in its entry and reentry down through the alphabet of this Index. Thus:

DNA, double helix, X-ray crystallography, genetic code, structure of DNA	
resolved	1954 Oct. p. 54-61 [5]
double helix, DNA, X-ray crystallography, genetic code, structure of DNA	
resolved	1954 Oct. p. 54-61 [5]
genetic code, DNA, double helix, X-ray crystallography, structure of DNA	
resolved	1954 Oct. p. 54-61 [5]
X-ray crystallography, DNA, double helix, genetic code, structure of DNA	
resolved	1954 Oct. p. 54-61 [5]

In most cases, a secondary descriptive phrase, highlighting some aspect of the entry (in the example above: structure of DNA resolved) rides along with the rotating key words. Each entry is designed to serve, therefore, as a "mini-abstract" of the original.

Entries that begin with the same key word are listed in chronological order; articles are listed first, and "Science and the Citizen" items follow.

Articles are referenced by first and last page numbers (thus: 1978 June p. 60-72); "Science and the Citizen" items, by first page number (thus: 1978 June p. 74).

References to about one third of the articles close with a one- to four-digit number in brackets (in the example above: [5]); this is the Offprint number and identifies articles republished as Offprints by W. H. Freeman and Company (660 Market Street, San Francisco, California 94104).

*Listing of Tables of Contents* in chronological order permits ready identification, by titles and authors, of the articles cited in the foregoing index.

*Index to Authors* lists all authors of articles.

*Index to Titles* lists all articles by the first word in the title (exclusive of "The" or "A") and by the other key words in the title. "Underwater Archaeology in the Maya Highlands" thus appears under "Archaeology" and "Maya" as well as "Underwater."

*Index to Book Reviews* lists longer book reviews. The section is divided into three parts: Authors of books reviewed, Titles of the books and Reviewers.

*Index to Mathematical Games* lists the puzzles, games and diversions presented in the department since its inception in January, 1957, under editorship of Martin Gardner. It also includes Gardner's article on Flexagons (December, 1956) and the "twelve-ball" problem that cropped up in "The Amateur Scientist" in 1955.

*Index to The Amateur Scientist* lists the projects, experiments and demonstrations presented in this department from April, 1952, through February, 1976, (under the editorship of A. G. Ingalls until April, 1955, and thereafter under the editorship of C. L. Stong) and from July, 1977, through June, 1978, under the editorship of Jearl Walker.

*Index to Proper Names* lists the names of all persons mentioned in the articles or "Science and the Citizen" items and of places and institutions featured in a primary role.

The indexing was accomplished with collaboration of Excerpta Medica B. V., of Amsterdam; Infonet B. V., of Amsterdam, conducted the computer processing of the entries and composition of the pages.

#### THE EDITORS

*November, 1978*

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tube, physiology of neural transmission, concentration gradients  
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computer, life and work of Charles Babbage 1952 Apr p 66-72  
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recombination, sexuality in bacteria 1956 July p 109-118 [50]  
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transduction by phage infection 1958 Nov p 38-43 [106]  
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1961 June p 92-107 [89]  
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1965 July p 92-99  
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1969 Jan p 108-115 [1132]  
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1970 Jan p 88-102 [1167]  
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1975 Aug p 36-44
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1977 Mar p 106-114
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1955 Jan p 44
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1964 Mar p 59
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1954 Oct p 49
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1968 Apr p 69-77
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1974 Jan p 51
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1973 Nov p 70-82
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1951 Mar p 18-21
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1950 Sept p 51
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1963 Sept p 208-220
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1966 Aug p 44
- smell of bread  
1968 June p 46
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1953 Mar p 88-94
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1959 Aug p 74-84 [828]
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1956 Oct p 74
- carotid bodies  
1974 June p 51
- breathing, whale, diving physiology  
1949 July p 52-55
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1960 Jan p 138-148
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1962 Dec p 120-130
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1963 Oct p 27-38
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1963 Dec p 92-106
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1965 May p 88-96 [1011]
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1966 Feb p 56-68 [1034]
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1967 Jan p 25-31 [503]
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1967 May p 34-43
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1968 Aug p 66-74 [1123]
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1969 Aug p 100-106 [1156]
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1971 Dec p 72-79 [1238]
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1974 Nov p 96-105 [1307]
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1952 Dec p 58-60
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1954 Dec p 33-39
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1955 Oct p 56-68
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1958 Mar p 29-35
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1960 Jan p 82-94
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1967 May p 25-33
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1970 Nov p 13-21 [339]
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1977 Mar p 26-35
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1950 Jan p 28
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1952 Feb p 34
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1952 Nov p 42
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1953 July p 40
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1956 Feb p 52
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1959 July p 65
- uranium ore resources  
1961 Mar p 82
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1963 Jan p 58
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1967 Nov p 59
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1968 June p 44
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1976 May p 50
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1977 Mar p 58
- nuclear energy and weapons proliferation  
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1964 Nov p 48-54 [488]
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1959 June p 90-100
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1960 Feb p 136-144
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1962 Mar p 94-104
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1973 July p 74-85
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1954 Nov p 60-71
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1966 Oct p 78-84 [1053]
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1970 Apr p 32-42
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1970 Nov p 30-38
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1972 Apr p 76-83 [1246]
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1956 Mar p 93-102
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1950 Aug p 30
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1959 Aug p 70
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1967 Apr p 52
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1977 May p 106-116 [577]
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1953 Sept p 84
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1959 Jan p 120-130
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1955 Feb p 46-50 [216]
- spark chamber, particle accelerator, cloud chamber, particle tracks  
1962 Aug p 36-43
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1964 Oct p 36-45
- new particle trap  
1954 Jan p 39

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1966 Oct p 88-98
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1956 Dec p 66-80 [243]
- Callisto, Galileo, Jupiter, Jovian satellites, solar system, Europa, Ganymede, Io  
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1951 Feb p 34
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1950 Aug p 32-41 [46]
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1968 Sept p 96-108
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1957 Oct p 48-54
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1959 Mar p 48-53 [842]
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1971 Jan p 64-72 [1209]
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1960 Jan p 52-59
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1953 May p 65-73
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1964 July p 90-98 [648]
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1965 Mar p 23-31
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1976 July p 116-124
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1955 June p 72-79
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1957 Apr p 111-118
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1948 Dec p 40-43
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1949 Jan p 11-15
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1949 Dec p 22-24
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1950 July p 44-47
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1952 June p 66-72
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1956 Oct p 50-55
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1961 Aug p 99-107
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1964 May p 88-96
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1965 Nov p 75-83 [1024]
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1968 July p 38-46
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1976 May p 58-73 [1339]
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1952 June p 34
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1953 July p 46
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1960 Mar p 93
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1962 Apr p 74
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1972 Mar p 43
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1973 Sept p 66
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1959 June p 85
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1959 Sept p 164-176
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1960 Jan p 99-108
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1966 May p 40-50
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1968 Aug p 34-40
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1966 Mar p 34-41
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1972 Jan p 24-33 [1239]
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1973 Oct p 26-33
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1974 Feb p 32-40 [1289]
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1969 Dec p 17-25 [524]
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1971 Feb p 32-42 [658]
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1974 Feb p 92-105
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1952 Nov p 76-84
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1967 Dec p 104-116
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1968 May p 38-46
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1952 Feb p 52-56
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1948 Oct p 50-53  
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1964 Nov p 80-94  
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1950 Jan p 42-45
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combustion, biosphere, atmosphere, carbon dioxide  
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breathing, animal experiments in water-breathing 1968 Aug p 66-74 [1123]
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energy technology, fossil fuel cycle, industrial emissions,  
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1975 Feb p 30-38
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prevention, increased incidence of cancer sought in environmental  
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disease, effects of smoking 1962 July p 39-51
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electrocardiography, nerve conduction, heart infarct 1968 July p 19-27
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events in the heart 1961 Nov p 132-141
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1957 Feb p 86-94
- medulla, reticular formation, brain, perception, motor reflex, neurophysiology, attention and orienting mechanism in brain  
1957 May p 54-60 [66]
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1958 Aug p 84-90 [38]
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1961 Sept p 209-220 [98]
- computer technology, redundancy, reliability, error suppression  
1964 Feb p 103-112 [298]
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1966 May p 102-110
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1971 Feb p 68-75 [1212]
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1971 Mar p 96-104 [535]
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1977 Oct p 132-140 [579]
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1975 May p 66-79
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1953 Nov p 65-72
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1954 Feb p 54-62
- centrioles, mitotic spindle, sea urchin egg, chromosome, digitonin  
1953 Aug p 53-63
- C.E.P.: circular error probability
- C.E.P., counterforce strategy, atomic weapons, cruise missiles, MIRV, arms race, missile accuracy, strategic weapons, accuracy as multiplier of force  
1975 July p 14-23
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1976 Jan p 90-101 [568]
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1951 Apr p 64-69
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1953 June p 56-66
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1959 July p 48-55
- invisible twin North Star of Polaris  
1956 Feb p 56
- cosmology, intergalactic yardstick lengthens  
1958 Sept p 86
- ceramics, materials technology, glass fiber, optical glass, amorphous solid, properties of glass as 'undercooled liquid'  
1961 Jan p 92-104
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1967 Sept p 68-79
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1967 Sept p 112-124
- ductility in single-crystal magnesium oxide  
1958 Apr p 50
- cerebellar cortex, brain, brain circuitry, neuronal networks, Purkinje cells, mossy fibers  
1975 Jan p 56-71 [1312]
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1948 Oct p 26-39 [13]
- brain, central nervous system cerebrum, neurophysiology, cerebral-cerebellar coordination  
1958 Aug p 84-90 [38]
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1973 July p 96-103 [1277]
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1948 Oct p 26-39 [13]
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1953 Sept p 118-126 [11]
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1958 Sept p 135-146 [65]
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1964 Jan p 42-52 [174]
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1968 June p 64-76 [515]
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1970 Mar p 66-78 [526]
- information processing  
1956 Oct p 72
- see also visual cortex
- cerebral dominance, brain hemispheres, perception, split-brain experiments, corpus callosum, intelligence, language, localization of brain function  
1967 Aug p 24-29 [508]
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- high-energy physics, tachyons, speed of light, special relativity, hypothetical particles faster than light 1970 Feb p 68-77
- for particle counting 1952 Aug p 33
- cermets, composite materials, dispersion-strengthened composites, fiber-reinforced composites, particulates 1973 July p 36-44
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- ceruloplasmin, hemocyanin, oxygen transport, enzymes, copper deficiency, cytochrome oxidase, copper biochemistry, Wilson's disease, tyrosinase 1968 May p 102-114
- cesium clock, atomic clock, ammonia maser, maser, zenith tube, mercury mirror, improvements on sidereal time 1957 Feb p 71-82 [225]
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1955 Dec p 34-39 [831]
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1954 Jan p 32-36 [16]
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not breakdown in reverse  
1960 Feb p 46-51
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properties of matter under  $2 \times 10^5$  p.s.i.  
1959 Nov p 61-67
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catastrophes  
1961 Aug p 50-58 [801]
- found in nature  
1960 Sept p 104
- Arizona Barringer Crater  
1962 Feb p 78
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perceptions, discrepancy principle  
1972 Mar p 74-82 [542]
- behavioral regression, child development, human behavior, infant  
perceptions learning  
1976 Nov p 38-47 [572]

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- molecular beam, electron theory, resonance absorption, atomic radiation, gas molecules, nuclear magnetic resonance, Stern-Gerlach experiment 1965 May p 58-74
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1956 June p 131-138
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1966 June p 56
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concept  
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1949 Feb p 30-41
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1951 Dec p 22-25
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radiation damage to living cell  
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RNA, DNA, endoplasmic reticulum, nuclear control of cell  
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transformation in the cell  
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membrane  
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glucogenesis, citric-acid cycle, glycolysis, oxidative phosphorylation,  
cellular transformation of energy  
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chromosome, how cells make molecules  
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division  
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embryonic development, zygote, fertilization, ovum, clone, how cells  
specialize  
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development, how cells associate  
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cell membrane, fertilization, functions of cell membranes  
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streaming, actin, myosin, underlying unity of cellular motion  
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ganglion reflexes, neuroreceptors, retina, nerve impulse,  
neurotransmitters, neural synapse, neuromuscular synapse, how cells  
communicate  
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buds, how cells receive stimuli  
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differences in tissue cells  
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- emergency medicine, homeostasis, wound shock, body fluids, shock,  
 treatment of shock 1958 Dec p 115-124
- eminent domain, urban renewal, slums, cities, housing, relocation, urban  
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 1965 Sept p 194-204
- emission nebulae, color photography, interstellar gas, ionization, nebular  
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- emission standards, air pollution, Clean Air Act, Environmental  
 Protection Agency 1973 June p 14-21
- emmer, wheat, Einkorn wild emmer, hybrid cells, fungi, chromosome  
 doubling, plant breeding, origin and perfection of wheat  
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 Pavlov, psychology, thyroidectomy, stress neurosis conditioned  
 reflex is shown to be a neurosis 1954 Jan p 48-57 [418]
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 psychoanalysis, 'mechanical boy' 1959 Mar p 116-127 [439]
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 dwarfism, 'bone age', anorexia nervosa 1972 July p 76-82 [1253]
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 1956 Jan p 38-42 [469]
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- emotional illness, Oedipus complex, psychoanalysis 1949 Jan p 22-27
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- mental health, schizophrenia, epidemiology, family, psychosis, income  
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 bind, taxonomy of emotional illness, family therapy  
 1962 Aug p 65-74 [468]
- education, poverty, group behavior, rural poverty, community action,  
 social psychology, study of community regeneration  
 1965 May p 21-27 [634]
- behavioral psychology, child psychiatry, autism, schizophrenia  
 1967 Mar p 78-86 [505]
- group therapy, therapeutic community, role-channeling  
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- community mental-health centers, mental health, psychiatric hospital  
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- emphysema, bronchitis, air pollution, public health, smog environmental  
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- acute respiratory failure, intensive care, tracheostomy, lung, alveolar  
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- emulsification, ultrasonics, interferometry, nondestructive testing, sonar  
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- enamel, teeth, dentin, metabolism fluoridation 1953 June p 38-42
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- toxoplasmosis, parasitism, intracellular parasite, infectious disease,  
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- energy storage, economic geography, pipelines, power transmission, tankers, power, economic geography of energy production distribution and consumption  
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1954 Oct p 62-66 [237]
- energy exchange, ocean microstructure, ocean circulation, sea water salinity, oceanic stirring, sea-water temperature  
1973 Feb p 64-77 [905]
- energy-information interaction, entropy in communication power, information flow, information theory, thermodynamics  
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- economic development, energy technology, industrialization, population, fuel consumption, energy requirements and resources for economic development 1963 Sept p 110-126
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- energy transfer, superconductors, electron pairs, organic superconductor proposal for room-temperature superconductor 1965 Feb p 21-27
- convection currents, plants, thermoregulation, solar radiation, thermal radiation, transpiration, heat transfer in plant leaves 1965 Dec p 76-84 [1029]
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- actinomyosin, mechanochemical engine, muscle contraction 1954 Mar p 72-76
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- Africa, termite, insect behavior, air conditioning, airconditioned termite nests 1961 July p 138-145
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vision  
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stereopsis, visual cortex  
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immunization  
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language, reading, perception of words  
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1954 Nov p 48
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1955 Jan p 42
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policy, military technology  
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psychosis, income status  
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1974 Aug p 53-61 [561]
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fauna, Antarctica, flora, lichens, blue-green algae, ecology, Antarctica terrestrial life 1962 Sept p 212-230 [865]  
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1952 Jan p 22-27
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1962 Oct p 60
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1955 June p 92-100
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1955 June p 92-100
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1960 Sept. p 130-148 [605]
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1951 Mar p 44-47
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1954 Apr p 31-34
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1954 June p 70-75 [43]
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1964 Nov p 48-54 [488]
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1952 Aug p 15-19
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1976 Sept p 154-163
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1954 June p 70-75 [43]
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1973 May p 24-29
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1963 Nov p 95-105
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1967 Sept. p 160-176
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1960 Nov p 72-81
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1972 Sept p 95-113
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1973 Nov p 28-35
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1977 Aug. p 40-48 [373]
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1965 Feb p 28-37
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1967 Sept p 160-176
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1973 July p 36-44
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1968 July p 19-27
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1957 Sept. p 204-216 [35]
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1962 Mar p 60-66
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1962 Mar p 60-66
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1968 Mar p 32-37 [1103]
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1969 June p 40-50 [1144]
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1971 June p 44-52 [1225]
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1954 Apr p 34-37
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1964 Jan p 108-118
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1952 May p 58-62
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1957 June p 113-122
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1950 Dec p 13-17
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1953 Sept p 52-57 [241]
- Maxwell's equations, electromagnetism, life and work of James Clerk Maxwell  
1955 June p 58-71
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1964 Sept p 128-146
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1974 July p 50-59
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1961 Dec p 112-122 [470]
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1975 Apr p 34-43 [563]
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1958 July p 94-101
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1952 Oct p 38
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1961 Jan p 79
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1967 Jan p 58
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1972 July p 52-60
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1970 Apr p 48
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1949 Nov p 44-47
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1951 Dec p 38
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1956 Oct p 68
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1953 Apr p 52
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1949 Oct p 16-19
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1957 Aug p 113-118
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1963 May p 143-152
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1949 Jan p 28
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1956 Oct p 68
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1976 Sept p 40-49
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1976 Sept p 50-64
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1976 Sept p 74-86
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1976 Sept p 88-97
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1976 Sept p 98-105
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1976 Sept p 106-123
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1976 Sept p 128-150
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1976 Sept p 154-163
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1976 Sept p 164-178
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1976 Sept p 180-194
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1976 Sept p 196-205
- world food production  
1976 Sept p 66
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- Food and Drug Administration, *see* F D A
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1952 Dec p 15-17
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1956 Apr p 105-112
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1956 Dec p 46-50
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1962 Sept p 186-210
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1969 Feb p 22-29 [1133]
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1969 Sept p 146-162 [884]
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1969 Sept p 178-194 [886]
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1970 Sept p 64-74 [1190]
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1971 Sept p 104-115 [665]
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1975 Mar p 76-86 [1318]
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1976 Sept p 74-86
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1972 Mar p 15-21
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1967 Feb p 104-114
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1951 Apr p 37
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1953 Oct p 31-35
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- mouse, population control, animal migration 1955 Dec p 92-100
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- chromosomal anomalies, lethal heredity  
1952 July p 58-61
- 'atoms for peace', radiation hazards, safety standards, Geneva biology  
1955 Oct p 38-42
- erythrocyte, sickle cell disease, genetic disease, single gene-single amino acid deletion  
1958 Jan p 68-74
- fruit fly, insect eye, paper chromatography, fractionating the fruit fly  
1962 Apr p 100-110 [1166]
- DNA, phage X174, single-stranded DNA  
1962 July p 109-116 [128]
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1972 Jan p 24-33 [1239]
- antibiotic resistance, bacteria, infectious disease, drug resistance, plasmids, Rh factor, bacterial conjugation  
1973 Apr p 18-27 [1269]
- albinism, Siamese cat, visual cortex, white mink, white tiger, cross-eyed trait  
1974 May p 44-54 [1294]
- air pollution, evolution, melanism, moths, population genetics, predation, evolution observed again  
1975 Jan p 90-99 [1314]
- genetic variation, natural selection, polymorphism, mollusk shells, biological diversity, discontinuous variation  
1975 Aug p 50-60 [1326]
- carcinogenesis, cancer epidemiology, environmental carcinogens, immune response, virus disease, cancer prevention  
1975 Nov. p 64-78 [1330]
- cat color, genetic variation, human migration, population genetics, cline maps, Hardy-Weinberg equilibrium  
1977 Nov p 100-107 [1370]
- Hiroshima offspring, no genetic harm, yet  
1954 Jan p 40
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1957 Mar p 133-142
- blood groups, genetic drift, mutation, consanguinity, evolution, population genetics, Parma Valley, Italy  
1969 Aug p 30-37
- evolution, mutation, genetic load, electrophoresis, population genetics, heterozygosity  
1970 Mar p 98-107 [1172]
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1967 May p 80-94 [1074]
- gene recombination, 1951 Cold Spring Harbor conference  
1951 Oct p 22-25
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1956 July p 109-118 [50]
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1961 June p 92-107 [89]
- gene regulation, DNA, chromosome puffs, insect chromosome, RNA synthesis, hormonal induction  
1964 Apr p 50-58 [180]
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1968 Dec p 24-35 [1128]
- cell nucleus, chromatin, chromosomal proteins, DNA, histones, nucleoproteins, oxidative phosphorylation  
1975 Feb p 46-57 [1315]
- DNA operator, DNA repressor, gene expression, host-restriction endonuclease, operator-repressor system  
1976 Jan p 64-76 [1333]
- cell receptors, endocrine hormones, hormonal action, protein synthesis, steroid hormones  
1976 Feb p 32-43 [1334]
- gene splicing, gene manipulation, National Academy of Sciences, recombinant DNA, science policy, NIH guidelines  
1977 July p 22-23 [1362]
- gene structure, DNA, E. coli, nucleotide sequence, viral DNA, bacterial virus OX174, plus-and-minus method  
1977 Dec p 54-67 [1374]
- gene synthesis, alanine transfer RNA gene  
1970 July p 49
- gene transcription, mRNA, protein synthesis, the RNA messenger from gene to protein synthesis  
1962 Feb p 41-49 [119]
- hybrid cells, DNA, RNA, ribosomal RNA, gene complement, density-gradient centrifugation, DNA-RNA hybridization experiments  
1964 May p 48-56
- tRNA, protein synthesis, molecular structure, 3-D structure of tRNA  
1978 Jan p 52-62 [1377]
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1958 Nov p 38-43 [106]
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1956 Nov p 48-53 [18]
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1966 Mar p 34-41
- pneumococcus, cell wall, recombinant DNA, transformation induced by factor synthesized by cell  
1969 Jan p 38-44
- bacterial transformation, Diplococcus pneumoniae, extra-cellular activator of transformation competence  
1969 Dec p 38-44
- cancer, SV40 virus, chromosome mapping, tissue culture, somatic cells, hybrid cells, genetics of human cancer  
1978 Feb p 117-125 [1381]
- gene translocation, Down's syndrome, chromosomal anomalies, Klinefelter's syndrome, trisomy 21, genetic defect, meiosis, mitosis, nondisjunction, afflictions associated with abnormal chromosome complement  
1961 Nov p 66-76 [150]
- general education, little of it  
1954 Dec p 60
- general practitioner, medical care, community hospital, medical center, medical specialist, laboratory services, Bingham plan, organization of medical technology  
1948 Oct p 7-13
- general relativity, astronomy, galaxies, red shift, galactic recession, universe expansion, science, stellar evolution, astronomy 1900-1950  
1950 Sept p 24-27
- curvature of space, Riemann non-Euclidean geometry  
1954 Nov p 80-86
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1959 May p 149-160
- gravitational constant, science history, Eötvös experiment, Eötvös experiment confirmed  
1961 Dec p 84-94
- star displaced 170 sec arc  
1953 Feb p 39
- revision by Einstein  
1953 May p 54
- test for gravitational shift in frequency of gamma rays favorable but not conclusive  
1960 Mar p 84
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1960 May p 88
- confirmed by Mossbauer-effect test of gravitational shift of solar radiation  
1962 Mar p 72
- test proposed, radio echoes from Mercury or Venus  
1965 Mar p 56
- solar oblateness and Mercury's orbit  
1967 Mar p 48
- solar deflection of quasar signal  
1970 Aug p 44
- reaffirmed by clock (cesium) paradox experiment  
1972 Sept p 67
- generator control, automatic control, computer technology, electric power generation, power system control  
1974 Nov p 34-44
- genesis, cosmology, universe expansion, Olber's paradox, world lines, curvature of space, red shift, galactic evolution, evolutionary universe, element formation  
1954 Mar p 54-63
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1960 Sept p 206-217 [609]
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1954 Oct p 54-61 [5]
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1955 Oct p 70-78
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1956 Mar p 42-46
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1957 Sept p 188-200 [54]
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1962 Oct p 66-74 [123]
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1963 Mar p 80-94 [153]
- tobacco mosaic virus, RNA nucleotides, protein synthesis, amino acid sequence, mutation, relation of RNA mutations to amino acid changes  
1964 Oct p 46-54 [193]
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1966 Apr p 102-109
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1966 Oct p 55-62 [1052]
- cell communication, communication nerve impulse, hormonal action, metabolic information  
1972 Sept p 42-51 [1257]

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- recombinant DNA 1960 July p 82
- coding specificity of sRNA 1963 Jan p 61
- DNA codons universal 1963 Aug. p 49
- DNA, codon has three nucleotides 1964 Mar p 54
- streptomycin 1964 July p 44
- GUU for valine 1964 Sept p 82
- nonsense-codon punctuation 1965 Aug p 43
- amino acid-codon structural fit 1966 June p 56
- gene-protein relation 1966 July p 50
- uniformity 1967 Apr p 48
- UGA means stop 1968 Apr p 44
- genetic code confirmation, virus R17 1969 Nov p 58
- genetic convergence, continental drift, speciation, reptile evolution, radiation, Gondwanaland, Laurasia, mammalian evolution, supercontinent breakup and animal diversification 1969 Mar p 54-64 [877]
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- sensory perception, inherited sense defects 1952 May p 64-70 [406]
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- heredity, porphyria, metabolic disease, George III 1969 July p 38-46 [1149]
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- liposome package treatment of lysosomal disease 1975 Apr p 56
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- blood typing, Judaism, racial discrimination, religious persecution, social evolution population genetics, Jewish community of Rome 1957 Mar p 118-128
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- algae, bacteria, legumes nitrogen fixation nitrogenase, Haber process rhizobium legumes symbiosis, nitrogenase biological nitrogen fixation 1977 Mar p 68-81
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- 'new' eugenics 1969 July p 50
- rabbit hemoglobin in frog cell 1971 Dec p 40
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- genetic exchange, bacteriophage sexual reproduction 1948 Nov p 46-51
- genetic load, evolution, gene pool, mutation, electrophoresis, population genetics, heterozygosity 1970 Mar p 98-107 [1172]
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- Barr body, sex differences, chromosome, cytology, Klinefelter's syndrome, Turner's syndrome, chromosomal anomalies, sex differences in tissue cells 1963 July p 54-62 [161]
- fruit fly, gene loci, genetics of behavior, insect behavior, mutants 1973 Dec p 24-37 [1285]
- abnormalities of sexual development 1963 Nov p 70
- cat color 1974 Apr p 50
- genetic research, stable artificial mutants 1957 Feb p 67
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- genetic transduction, carcinogenesis, polyoma virus, recombinant DNA, virus disease, 'temperate' infection, viral induced malignancy 1960 Nov p 63-71 [77]
- genetic variation, influenza virus immunization, chick-embryo culture, hemagglutination, vaccine, difficulty in securing flu immunization 1953 Apr p 27-31
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- genetics of behavior, fruit fly, gene loci, insect behavior, genetic mosaic, mutants 1973 Dec p 24-37 [1285]
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- geochronology, geology, seismology, Earth science, science Earth core, Earth mantle, ocean floor, geology 1900-1950 1950 Sept p 36-39
- fission-track dating, glass age, meteorite age, mineral age, pottery age, radioactive decay, uranium fission 1976 Dec p 114-122
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 geology, seismology, Earth science, science, Earth core, Earth mantle, geochronology, ocean floor, geology 1900-1950 1950 Sept p 36-39  
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 New Zealand installation 1957 Dec p 62  
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 gerrymander, reapportionment, redistricting, elections, representative government, computer applications 1965 Nov p 20-27  
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 gift giving, human behavior, psychological implications 1967 Oct p 62  
 Gigantopithecus, Australopithecus, human evolution, hominid, pongids 1970 Jan p 76-85  
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1948 Oct p 40-45
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1949 Feb p 46-49
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1949 May p 48-51 [834]
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1949 July p 48-51
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1952 Aug p 57-59
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1955 Sept p 84-92 [809]
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1958 Feb p 54-63
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1958 June p 85-92 [835]
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1960 May p 70-79
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1962 Jan p 112-123
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1962 Sept p 132-146 [861]
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1962 Sept p 151-166
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1963 Feb p 76-92 [867]
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1964 Aug p 28-36
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1968 Apr p 52-64 [874]
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1969 Sept p 106-122 [882]
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1974 June p 96-105 [685]
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1970 June p 100-110
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1970 June p 100-110
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1951 July p 37-45
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1963 Nov p 120-130
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1967 Sept p 68-79
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1967 Sept p 126-136
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1968 Sept p 190-202
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1969 Nov p 30-41
- lens aberrations, optics, photographic lenses  
1976 Aug p 72-83
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1976 Dec p 114-122
- glass electrode, pH, galvanic cell, hydrogen ions, acidity  
1951 Jan p 40-43
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1961 Jan p 92-104
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1962 Jan p 124-134
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1977 Aug p 40-48 [373]
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1963 Nov p 120-130
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1959 Aug p 110-117
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1961 Dec p 62-70 [134]
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1961 Mar p 124-134
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1973 Dec p 102-109
- globular cluster stars, Milky Way, nebulae, spiral arms, dust clouds, galactic center, seeing a galaxy from the inside  
1950 Feb p 30-39
- Clouds of Magellan, galactic center, nebulae, Southern sky, Eta Carina, astronomical riches of the southern sky  
1952 July p 46-57
- dwarf stars, H-R diagram, spectroscopy, stellar evolution, subdwarf stars bluer because poorer in heavy elements  
1961 June p 111-120
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1970 July p 26-39
- black hole, binary stars, galactic energetics, neutron stars, stellar evolution, X-ray stars, astronomy satellites, 'bursters'  
1977 Oct p 42-55 [385]
- globulin, kinins, peptides, kallidin, venom, inflammation, bradykinin, local hormones, production and distribution  
1962 Aug p 111-118 [132]
- Glomar Challenger, deep-sea drilling expeditions  
1970 Aug p 45
- findings  
1972 June p 51
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1972 Dec p 26-36 [904]
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1953 Jan p 40-48 [37]
- glory, light diffraction, optics, rainbow  
1974 July p 60-73
- Glossopteris, Antarctica, fossil fauna, fossil flora, geology, paleontology, coal, continental drift evidence  
1962 Sept p 168-184 [863]
- continental drift, glaciation, Gondwanaland, Laurasia, paleomagnetism, sea-floor spreading, supercontinents, plate tectonics, continental drift confirmed  
1968 Apr p 52-64 [874]
- glow worm, bioluminescence, firefly, abyssal fish, luciferase, 'cold light'  
1948 May p 46-49
- glucocorticoids, ACTH, adrenal hormones, pituitary hormones, stress  
1971 Jan p 26-31 [532]
- glucogenesis, ATP, chloroplast, mitochondrion, photosynthesis, cell metabolism, citric-acid cycle, glycolysis, oxidative phosphorylation, cytology, cellular transformation of energy  
1961 Sept p 62-73 [91]
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1972 Aug p 97-105 [1256]
- glue, *see* adhesive
- glycocalyx, bacterial-cell surface, bacterial infection, infective specificity, how bacteria stick  
1978 Jan p 86-95 [1379]
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## H

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- heavy water, U.S. sales abroad 1956 May p 55
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- aeronautics, aircraft design, helicopter flight, history, future development 1967 Apr p 38-46
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psychology, illusions as clues to organization of perceptual  
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of death 1950 June p 44-46  
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myogenic rhythm, rat cardiac cells in vitro 1962 May p 141-152  
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1959 Mar p 87-96 [56]  
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thermal properties of materials 1967 Sept p 180-188  
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engine, hot-air engine 1948 July p 52-55  
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- astrophysics, neutrino, neutrino astronomy, neutrino 'telescope'  
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- matter, energy, momentum, conservation law, conservation laws in  
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- proton spin, spin, 'strong' force, electron scattering, dependence of  
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- storage rings, synchrotron, particle accelerator, colliding beam  
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- antimatter, Leidenfrost phenomenon, Zeeman effect, Klein theory,  
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- Cerenkov radiation, tachyons, speed of light, special relativity,  
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- proton model, neutron structure, quark, scattering experiments,  
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- hadrons, heavy leptons, J particle, quantum mechanics, quark  
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- omega meson found 1961 Nov p 79
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- resonance 'particles', 'eightfold way' 1964 Jan p 54
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- X<sub>1</sub> particles confirm SU(3) 1969 Mar p 48
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agriculture 1952 Aug p 15-19
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race, CS gas, virus disease, nicotine, tear gas, chemical-biological  
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1965 Sept p 122-132
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1971 Apr p 52
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1957 June p 62-68
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1966 Jan p 82-90
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1973 Jan p 13-21
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1957 Oct p 56
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1969 Feb p 44
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1972 Aug p 46
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1975 Oct p 106-113
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1950 May p 26
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1950 Dec p 27
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1953 Jan p 30
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1955 Aug p 46
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1956 Apr p 76-89
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1965 Feb p 90-101
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1973 Jan p 13-21
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1955 July p 58-67
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1955 Sept p 84-92 [809]
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1974 June p 72-79 [414]
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1973 Apr p 46-61 [907]
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1975 Sept p 106-117
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1964 Dec p 68-79
- hydrosol, light scattering, photometry, molecular size, aerosol, Tyndall spectra, measurement  
1953 Feb p 69-76
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1973 July p 86-95 [909]
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1955 Feb p 84-91
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1978 June p 90-105
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1968 Nov p 60
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1968 Mar p 54
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1965 July p 26-33
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1968 Dec p 36-44
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1967 Oct p 50
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1961 May p 120-130
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1974 Mar p 19-25
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1951 Dec p 64-70
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1952 Mar p 64-67
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1948 July p 26-29
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1952 Aug p 28-30
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1964 Feb p 58-64
- Aschoff bodies, rheumatic fever, streptococcus, infection, immune response, heart disease  
1965 Dec p 66-74
- hypersonic wind tunnel, Mach 10  
1949 Dec p 31
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1948 Aug p 44-47
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1959 Mar p 54-58
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1968 Jan p 86-96 [1093]
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1956 Jan p 52
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1957 Apr p 54-61
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1948 Sept p 24-27
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1958 Jan p 60-64
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1971 Jan p 96-102
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concept, perceptual development 1971 Oct p 30-38 [539]
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status of new medical technology 1949 Aug p 26-35
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epidemiology nature of the disease and public health  
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logic, method of exhaustion, nonstandard analysis  
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microrecording, electronic \*  
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1971 Sept p 148-160 [668]
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- electron spin**, ferromagnetism magnetic domains hysteresis magnetic properties of materials 1967 Sept p 222-234
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- input-output analysis**, interchangeability of materials, cost assessment, price trends, metals, plastics, competition among materials 1967 Sept p 254-266
- zone refining**, zone melting, distribution coefficient, germanium silicon, single crystals purified 1967 Dec p 62-72
- steel**, transformation-induced plasticity, strength ductility 1968 Nov p 36-45
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nuclear medicine, chemical imitation of radiation injury  
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SLBM sonar, acoustic detection 1972 July p 14-25 [345]
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MARV 1974 May p 20-31
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archeology cultures of southern Arabia 1969 Dec p 26-46 [653]
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development of U S South 1963 Sept p 224-232

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coal, energy resources, oil reserves, energy economics, fossil fuel, impending petroleum shortage

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1949 July p 48-51

opossum, marsupial, folklore

1953 June p 88-94

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1954 May p 64-68

chimney swift, life cycle

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Rattus rattus, Rattus norvegicus 1967 Jan p 78-85

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natural resources, Earth crust, mining, metal ores, natural concentration of metals

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aerial photography, infrared photography, remote sensing multiband camera, remote sensing of natural resources

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1958 Sept p 100-113 [48]

Darwinism, Wallace, science history, life and work of Alfred Russel Wallace

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contraction, science, physiology 1960-1970 1960 Sept. p. 71-77
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neurotransmitters, central nervous system, physiological psychology,  
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ganglion reflexes, neuroreceptors, retina, neurotransmitters, neural  
synapse, cytology, neuromuscular synapse, how cells communicate 1961 Sept. p. 209-220 [95]
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Turing machine, automata theory, mathematics in biology 1964 Sept. p. 145-164
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reflex, Renshaw cell, synapse 1966 May p. 102-110
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sodium ion potential, nodes of Ranvier 1952 Nov. p. 55-65 [20]
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system, inhibitory impulse 1968 May p. 83-90
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localization, visual perception, superior colliculus in integration at  
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allergic mechanism, in nervous disease 1949 July p. 15-19
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of inhibition 1974 Sept. p. 44-49
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contraction, science, physiology 1960-1970 1960 Sept. p. 71-77
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automatic control, feedback concept 1952 Sept. p. 45-55
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neuron systems as models for study 1967 May p. 44-52 [1072]
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stimuli, *Sciotoeca gregaria* 1971 Aug. p. 74-81 [1231]
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 Pennsylvanian period, coal, fossil, flora, Mississippian period, Carboniferous period, tropical flora, deposition of coal 1948 July p 46-51  
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- perfect square, perfect square of order 21 1978 June p 86
- perfumes, essential oils, oleoresins steam distillation, vacuum distillation, flavors 1953 Aug p 70-74
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technicology  
1958 Nov p 99-111
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1965 July p 34-42
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1965 Oct p 13-17
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hydrocarbon reserves  
1966 Feb p 21-29
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petroleum energy economy  
1978 Mar p 42-49 [930]
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1953 Oct p 56
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1967 Jan p 60
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1969 July p 54
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1969 Oct p 48
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1953 Sept p 76
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1968 July p 94-104
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1971 Dec p 46-58
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1967 June p 93-100
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1965 Oct p 13-17
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dynamics, control panel, automatic chemical plant  
1952 Sept p 82-96
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fuel consumption, shale, tar sands, coal liquefaction, the fuel  
problem  
1949 Dec p 32-39
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1963 Apr p 84
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1948 Sept p 9-15
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1951 Dec p 26-29 [423]
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1951 Oct p 38
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1951 Jan p 40-43
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1962 July p 109-116 [128]
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1951 Feb p 48-52 [51]
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membrane, fertilization, functions of cell membranes  
1961 Sept p 167-180 [96]
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contraction theory of amoeboid motion  
1962 Feb p 112-122 [182]
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1963 May p 64-72 [156]
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response, leukocyte, allergy, thymus gland, lymphatic system,  
cellular immunity  
1964 Feb p 58-64
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implication in disease processes  
1967 Nov p 62-72 [1085]
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repressor, lambda repressor, isolation of two gene repressors, how  
they work  
1970 June p 36-44 [1179]
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1962 June p 86
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1962 Oct p 119-128 [137]
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sex role, hormone  
1969 June p 104-111
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the first pharaohs  
1957 July p 106-116
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economics drug prescription, drug research, medical laboratory  
services  
1973 Sept p 161-166
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aminosalicylic acid, tracing action of TB drugs  
1956 Nov p 135-144
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neuropharmacology, psychiatry, research in pain suppression  
1957 Jan p 70-82
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1958 Jan p 60-64
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thalidomide catastrophe  
1962 Aug p 29-35 [1100]
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salicylates, aspirin, cancer therapy, chemotherapy, medical  
exploitation of chelates  
1966 May p 40-50
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antibiotics, medical care, herbal medicine  
1973 Sept p 102-112
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1977 May p 96-104 [1359]
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1956 July p 50
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1961 July p 71
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1977 Mar p 82-91
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1968 Apr p 32-40
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1969 May p 82-91
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quantum effects, quantum fluids  
1976 Dec p 56-71
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'things that go faster than light'  
1960 July p 142-152
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1966 Mar p 57
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1949 Oct p 46-49
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mutation, ostrich calluses, speciation, religion, orthodoxy,  
Darwinism, experiments in acquired characteristics  
1953 Dec p 92-99
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1948 June p 16-23
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behavior, ants, Gypsy moths, mice  
1963 May p 100-114 [157]
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baited lure, third-generation insecticides  
1964 Aug p 20-27 [189]
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order, territorial marking by rabbit  
1968 May p 116-126 [1108]
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1971 Mar p 86-93 [1213]
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1971 May p 98-108 [1222]
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1972 Sept p 52-60 [1280]
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silk moth, chemotaxis, communication  
1974 July p 28-35 [1299]
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1975 June p 32-36 [1323]
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1977 Dec p 146-154 [1373]
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1954 Mar p 44
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1955 Feb p 54
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1955 Mar p 50
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1948 July p 52-55
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1952 Oct p 72-76
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Descartes, Rene Descartes, biography  
1959 Oct p 160-173
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1967 Aug p 96-102
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Leibnitz, biography  
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antimony of the liar, proof and truth  
1969 June p 63-77
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1950 Oct p 44-47
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- air pollution, smog, 'blue haze', atmospheric inversion, particulates, ozone, peroxides 1955 May p 62-72
- photolysis, chemical reaction, reaction kinetics, free radicals, spectroscopy, color centers, high speed chemistry 1960 May p 134-145
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- vision, retina, photographic emulsion, vidicon, television camera, light image detection, electronic camera 1968 Sept p 110-117
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- chloroplast, photosynthesis, electron transport, chlorophyll, mechanism of photosynthesis 1969 Dec p 58-70 [1163]
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- by amplified light 1954 Mar p 46
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- in animal life 1952 Nov p 50
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- chloroplast, oxygen cycle biosphere, aerobic metabolism, ozone, oxidation-reduction reactions, geological record, oxygen-carbon balance 1970 Sept p 110-123 [1192]
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1958 Feb. p. 67-74
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1958 Apr. p. 97-106
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1952 Jan. p. 17-21
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1966 June p. 60-70 [869]
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1977 Mar. p. 82-91
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1959 Mar. p. 66
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1962 July p. 109-116 [128]
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1967 Nov. p. 88-98
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1967 Mar. p. 32-37 [1067]
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1978 May p. 154-161 [3009]
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1975 Dec. p. 84-94
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1965 Feb. p. 56-66 [1003]
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1969 Dec. p. 134
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1952 Mar. p. 64-67
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1954 Oct. p. 80-85
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1961 July p. 98-108
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1965 Feb. p. 56-66 [1003]
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1967 Jan. p. 25-31 [503]
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1967 Feb. p. 94-102
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1957 Apr. p. 62-66
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1958 Jan. p. 77-82 [403]
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1961 July p. 113-122 [458]
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1957 May p. 124-134
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1964 Feb. p. 94-100
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1950 Dec. p. 34-41
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1954 Aug. p. 38
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1955 Mar. p. 44-48
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1974 Feb. p. 92-105
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1954 Jan. p. 26-31
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1956 Mar. p. 36-41
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1973 Dec. p. 58-67 [1286]
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1974 Sept. p. 92-105
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1949 June p. 40-43
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1967 Apr. p. 21-27 [633]
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1969 Aug. p. 17-29 [330]
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1972 June p. 15-27 [344]
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1954 Aug. p 24-27
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information flow, information theory  
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mechanics of heat conduction  
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circulatory disorders  
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energy, stellar evolution  
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anomalous diffusion, nuclear power, leakage of plasma  
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confinement  
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thermostat  
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transpiration, energy transfer, heat transfer in plant leaves  
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oryx, survival without drinking  
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think'  
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Thompson  
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Klein bottle, trefoil knot, Koenigsberg bridges, four-color-map  
problem  
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1964 Dec p. 68-79
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1954 Aug p. 60-64
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1959 Aug p. 74-84 [828]
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1948 Nov p. 25
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1962 Oct p 30-37
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1949 Mar p 26
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1956 Aug p 29-35
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1968 Dec p 17-23
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1969 June p 19-29
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1970 Oct p 102-108
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1953 Jan p 31
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1949 Nov p 11-13
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1950 Mar p 52-55
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1976 Jan p 112-117
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1955 Apr p 42-44
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1962 Mar p 78-90
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1954 July p 36-40
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1974 Mar p 92-101
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1964 July p 34-42
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1961 Apr p 88-104
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1961 Nov p 144-154
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implies three cone pigments 1962 Nov p 120-132 [139]
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photochemistry, light, image detection, electronic camera  
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chlorophyll, retina cells, plant growth, light and living matter  
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illumination of visual centers 1970 Feb p 82-87
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perception, genesis of depth perception 1960 Apr p 64-71
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architecture, communication, trademarks, language, visual stimulus,  
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straight lines 1960 June p 121-129
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to discrete wavelengths of light 1958 Jan p 77-82 [403]
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visual cues 1961 Mar p 138-148
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evidence for perceptual theories 1961 June p 72-78 [466]
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perception 1964 Oct p 98-106 [487]
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discrimination, depth perception 1965 Feb p 38-48 [318]
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recognition hypothesis 1971 June p 34-43 [537]
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response, optical illusion, Craik-O'Brien effect  
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reading, perception of words 1972 July p 84-91 [545]
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music perception, right-hemisphere functions, auditory perception  
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enhancement, pattern recognition, recognition of faces  
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found to act against foreign nucleic acid  
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1954 Mar. p. 34-37
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issue on the living cell  
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infection, genetic transduction, viral induced malignancy  
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affair  
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vectors, multiple sclerosis  
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warfare  
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antigens, autoimmune disease, allergic reaction, immune-complex  
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synthesis, RNA, virus structure  
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DNA  
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subunits from core out  
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1954 Dec. p. 62-70 [32]
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core out  
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1952 Mar. p. 35
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rotating systems  
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retinal images, evidence for perceptual theories  
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buds, how cells receive stimuli  
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cortex, 'cortical saturation'  
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1976 Dec. p 42-48 [574]
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1977 Jan p 60-73 [575]
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1977 Dec. p 108-128 [1392]
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1965 Jan. p. 50
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1968 Sept p 174-186
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1963 July p 122-130
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1968 July p 38-46
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1970 Dec p 76-91 [1207]
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1975 July p 68-77 [1325]
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1965 Oct p 88-94 [627]
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1972 Feb p 48-58
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1955 Feb p 92-98
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1972 Feb p 48-58
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1948 July p 32-41
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1965 Mar p 82-91 [492]
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1973 Aug p 60-69 [910]
- volcanic eruption, Krakatoa, plant succession, ecology  
1949 Sept p 52-54
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1978 Apr p 120-132 [931]
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1967 Feb p 44-54
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1964 Apr p 106-114
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1951 Nov p 45-52
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1955 Sept p 62-66 [816]
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1958 Dec p 83-90
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1950 Feb p 40-43
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1965 Jan p 19-27
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1950 May p 52-55
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1957 Apr p 68
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1956 Oct p 118-126
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1966 July p 80-88
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1965 Mar p 104-110
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1970 Jan p 40-46
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1964 Dec p 116-122
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1967 Mar p 52
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1965 June p 58
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1956 Dec p 46-50
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1966 Aug. p 13-21
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1953 July p 50-59
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1969 May p 21-29
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1976 Sept p 154-163
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1976 Sept p 180-194
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1957 Apr p 74
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- wheel bounce, automobiles, road building, highway engineering, 'corrugated' road surface, 'washboard' road surface  
1963 Jan p 128-136
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1967 Sept. p 160-176
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1956 Jan p 34-37
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1959 Jan. p 46-53
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1968 Oct p 25-35
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1971 Feb p 24-31
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1968 Apr p 42
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1968 Feb p 40-48
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1955 Apr p 36-41
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1970 Oct. p 19-29 [1199]
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1952 June p 22-25
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1956 July p 48
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1975 Oct. p 53
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1968 May p 102-114
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1974 May p 32-43
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1955 Sept p 96-104
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1961 Mar p 124-134
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1961 Aug. p 120-131
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1974 Feb p 92-105
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1965 June p 100-108
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